**Newton’s 2nd Law of Motion** (Textbook pgs. \_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_)

Guiding Question - How does an object move when a force acts on it?

1. *Recalling Newton's first law of motion, how will an object be affected when the forces acting on it are not in equilibrium?*

The object will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. *What is the cause of this change?*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. *How do you expect the acceleration to depend on the applied force?*

The greater the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the acceleration.

1. *What property of an object determines how much acceleration a given force will cause?*

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the object (as measured by its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).

**Newton’s 2nd Law in terms of FORCE:**

Where Fnet is the “net force” or the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

According to the 2nd Law (Fnet = ma), if the Fnet is zero, the acceleration must be \_\_\_\_\_\_\_\_\_\_\_\_\_.

So the “object” is **either** at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or moving at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Only “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ forces” produce accelerations.**

**The Unit of Force:**

In the SI (metric) system… the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1 N is the amount of force required to accelerate a 1 kg object at \_\_\_\_\_\_\_\_\_ m/s2

So… **1 N = (1 kg)(\_\_\_\_\_\_\_\_\_)**

**Newton’s 2nd Law in terms of ACCELERATION:**

A. More Force = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Acceleration

*What type of relationship is this?*

2X the force = \_\_\_\_\_\_\_\_\_ the acceleration

3X the force = \_\_\_\_\_\_\_\_\_ the acceleration

half (1/2) the force = \_\_\_\_\_\_\_\_\_ the acceleration

B. More Mass = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Acceleration

*What type of relationship is this?*

2X the mass = \_\_\_\_\_\_\_\_\_\_ the acceleration

3X the mass = \_\_\_\_\_\_\_\_\_\_ the acceleration

half (1/2) the mass = \_\_\_\_\_\_\_\_\_\_ the acceleration

Using ‘**a’** for *acceleration*, ‘**F’** for *net* *force*, and ‘**m’** for *mass*, write Newton’s Law as an acceleration equation.

“The acceleration of an object is directly proportional to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

acting on the object, is in the direction of the net force, and is inversely proportional to the

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the object”

*Inversely proportional*? Acceleration \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as mass \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Formulas:**